ATTACHMENT to
OSA-2075-3-73

USERS GUIDE FOR MISSION PLAN PROGRAM (MPP)

1. Program Definitions:

a. Leg -- A leg is determined by a start coordinate and an end coordinate. All information concerning one leg is determined by one input card, and is identified by an alpha (A, B, C, etc.) character punched in CC (card column) 2. Each leg may be up to 15 segments in length, each segment of which may be up to 999 nautical miles in length.

b. Segment -- Each leg is subdivided into segments. The length of a segment may be controlled by the planner by inserting distance or time in appropriate card columns. Each segment of output is identified by two digits on the mission plan listing; i.e., Ø1, Ø2, 11, etc.

c. Route -- The identifier for a route is an alpha character punched in CC 1, and may be changed whenever the mission planner desires. There is no restriction as to the number of routes in a mission plan. Deviation or optional routes are identified by the alpha characters Y and Z, and may be inserted at any point in the mission, with no adverse effect to the primary mission. A primary alternate (missed refueling) route card is identified by the alpha character X, and must follow a refueling operation.

d. Mission -- One or more routes under one header card. Each mission results in a complete mission plan, but is not restricted to a complete profile. The mission may start and end at any point on a profile (i.e., begin to end penetration portion). This programming option permits the mission planner to subsequently give an in-depth analysis of any particular portion of a mission (i.e., the hostile penetration portion).

2. Classification Card: This card generates the mission plan classification; such classification being appropriately placed on the mission plan printout. It is a required card and must be placed immediately prior to the header card of the route data cards.

a. In Card Column (CC) 1, punch the classifier character: 1 = Confidential, 2 = Secret, and 3 = Top Secret.

25X1A2g

b. Serial Number of Classifier -- The numbers should be punched in CC's 2 through 7. If CC's 2 through 6 are blank, then: 1 in CC 7 = [redacted] classifier or a 2 in CC 7 = TKH-1 classifier.

c. Exemption Category -- Card Column 8 is used to describe this function and the codes are:

Ø = Program is not exempt from Declassification Schedule
1 = Exempt by para. 5B1.
2 = Exempt by para. 5B2.
3 = Exempt by para. 5B3.
4 = Exempt by para. 5B4.
Default is same as Ø in CC 8.

d. Declassification Date -- The purpose of this data is to establish a program printout which will exempt it from the Declassification Schedule. If columns 9 through 15 are blank, the printout will be: Impossible to Determine. Otherwise, Col. 9-10 is day of month; e.g., 13; Col. 11-13 is month; e.g., Mar; Col. 14-15 is year; e.g., 75.

e. Warning Stamp Print Instructions -- Col. 16 if a 1 is punched = printed warning stamp. If CC 16 is blank, no warning stamp is printed.

f. National Security Stamp Print Instructions -- Col. 17 if a 1 is punched = printed National Security stamp. If CC 17 is blank, no stamp is printed.

g. Control System(s) -- Card Columns 18-56 are used for control system program output; e.g., WORKING PAPERS.

3. Mission Header Card: This most vital card establishes and identifies many of the limiting or basic data parameters necessary for the proper conduct of the mission.

a. Identification Code -- In Card Columns 1-2 punch Ø1.

b. Mission Identification -- Card Columns 11-16 are used to "punch in" any six character designator associated with the mission; e.g., GS11Ø8.

c. Mission Start Date -- This date is punched in CC's 17-23: Day, month, year; e.g., 13MAR73.

d. Mission Start Time -- Card Columns 24-27 are used for this purpose. The time must be in hours and minutes Zulu; e.g., ØllØ = 1 hour, 10 minutes Zulu.

e. Preset Turn Radius -- Turn radius only to be used if it is desired to restrict the vehicle to one particular turning radius throughout the entire mission. CC's 28-31 are used to identify the turn radius; e.g., Ø6.7 equates to a 6.7 NM turn radius. If neither a turn radius nor a bank angle is given the program, the program will compute the turning radius on a predetermined G-force (1.175) and the flight conditions.

f. Bank Angle Turns -- Card Columns 32-35 only to be used if it is desired to restrict the vehicle to a particular bank angle, throughout the entire mission; e.g., Ø3Ø = 30° bank angle.

g. Mission Fuel Load -- The units of fuel; i.e., pounds or gallons, are specified in CC's 36-41.

h. Basic Weight/Zero Fuel Weight -- Contained in CC's 42-47 is the zero fuel weight of the vehicle. Those vehicles which have residual fuel onboard must include the weight of the trapped fuel in these CC's.

i. Comments Section of Header Card -- Columns 48-71 are presently reserved for freestyle comments. Suggest only pertinent mission data be punched in these CC's; e.g., SORTIE 1199.

j. Teletype (Paper Tape) Generator -- Card Column 72 of header card is used to request a magnetic tape containing a teletype message. If a 1 is punched in CC 72, a magnetic tape containing a complete teletype message is produced. If a 2 is punched in CC 72, a magnetic tape containing an abbreviated teletype message is produced.

4. Free Form Comment Cards: A capability exists to insert any comments/instructions desired. Any number of cards, containing comments, may be included. These cards must follow the header card and will be listed following the header information on the mission plan. Comments must not exceed CC 56 if they are to be included on a teletype message.

Comment Cards -- Punch an 8 in CC 1, of every card, to identify this subroutine.
Leave CC's 2-6 blank.
Card Columns 7-72 may be used for free form comments.
Remember not to go beyond CC 56 with comments, if you wish the comments to appear on a teletype message.

5. Mission Count Card: This card identifies, to the computer, the number of input cards for which it must compute data.

Card ID -- Punch a 2 in CC 1. In CC's 2-4 punch the number of mission cards; e.g., 2Ø32 = 32 cards. Mission comment cards not to be counted.

6. Mission Data: Certain basic information is required, as input information, to initialize the computer computations. With a minimum of input, the computer determines a multitude of data which is then placed on a printout, in a predetermined format.

a. Leg Card

(1) Route Designator. In CC 1, any alphabetic character may be placed, with the exception of letters X, Y, and Z, which are reserved exclusively for identifying missed refueling routes or other deviations from the mission. The X is reserved exclusively for the primary alternate at each refueling; Y and Z for other deviations. Route identifiers may be repeated if they are separated by at least one other route identifier.

(2) Leg Designator. In CC 2, any alphabetic character may be placed (punched) to designate the individual legs of one route. Leg designators may be repeated if separated by at least one other leg designator.

(3) Begin Leg. Beginning coordinates, in degrees, minutes, and tenths of minutes are punched in CC's 3 through 15, with CC 8 containing an N or S, designating North or South hemisphere, and CC 15 containing an E or W, designating East or West hemisphere. If there is no change from the preceding End Leg coordinates, CC's 3-15 may be left blank.

(4) End Leg. Ending coordinates, in degrees, minutes, and tenths of minutes are punched in CC's 16-28, for the leg determined by this card. Should the coordinates be unknown, leave CC's 16 through 27 blank and punch an E in CC 28. If left blank, except for the E in CC 28, end coordinates may be determined by a specified distance or time, in that order, along a great circle determined by the next known coordinates. It is entirely possible that neither beginning nor ending coordinates are known for any one leg. The number of unknown end leg coordinates leaves (N+1) legs undefined. As these legs are linked in succession, all but one must be defined by distance or time; the last leg receives the remainder of the great circle distance. Any leg must be defined so as not to exceed 15 segments.

(5) Beginning Altitude. Beginning altitude is punched in CC's 29-31 for this leg, with altitude truncated to hundreds of feet. If unknown, which is the case in a cruise climb profile, leave blank and insure the necessary information is furnished the program so optimum altitude may be computed. Information necessary for computing an unknown beginning altitude is: The end altitude of the previous leg will be assumed if this is other than a cruise climb or cruise leg. For the cruise climb or cruise profile, an optimum start altitude may be computed given the aircraft weight, speed, power level angle setting and temperature for this leg, provided these data have been programmed. It should be noted that the program will, for cruise climb or climb, ignore any input altitudes not optimum for weight, speed, etc. if all these conditions are available to the computer.

(6) End Altitude. Ending altitude for this leg truncated to hundreds of feet, to be placed in CC's 32-34. If unknown, leave blank and insure that the necessary information is furnished the program so the optimum altitude may be computed. Information necessary for determining an unknown ending altitude is: Any end altitude input for cruise climb will be ignored. The beginning altitude and flight condition designators will determine the end altitude. For cruise profile, the altitude will be maintained as close as possible to the desired input start altitude over the entire leg. For other than cruise climb or cruise profiles, if not input, the end altitude will be assumed from the start altitude of the next leg, either input or capable of program computation.

(7) Speed Data. An optional input speed is available. Mach, to the nearest hundredth, is input as an average for the entire leg, if input value is equal to or less than 5.0. True airspeed, in knots, is output if input value is greater than 5.0. Knots Indicated Airspeed (KIAS) is a program computation output. Card columns 35-38 are used for input speeds.

(8) Flight Condition. In CC's 39 and 40, the leg profile indicators should be placed. The different indicators available are:

AR - Air Refueling Leg
CH - Chase Leg
CC - Cruise Climb Leg (constant power setting)
CR - Cruise Leg (constant altitude)
DS - Descent Leg
CL - Climb Leg
HO - Hover
ID - Idle
VL - Vertical Lift-off

These flight conditions must be input with the leg on which it is to be reflected.

(9) Leg Time. Should it be desired to restrict a leg to a specific time, this data must be input in minutes in CC's 41-43. Time will be ignored if the beginning and ending coordinates or the distance has been input. For a hover, idle or vertical lift, enter time in minutes desired for the performance of this condition.

(10) Distance Data. In CC's 44-45, enter desired distance for this leg, in nautical miles. Distance will be ignored, if input, should both the beginning and ending coordinates are input Unknown leg.

(11) Segment Length Control Data. Card columns 46-48 are dedicated to this function. Enter the desired segment length in nautical miles. Each leg will be subdivided into segments of this length and numbered sequentially. Should a turn exist, the roll-out point becomes the last segment of the leg. Exercise due care on segment length, as more than 15 per unknown leg coordinates will cause a program abort. If 15 segments are exceeded on unknown end coordinates, the last segment will be set equal to the remaining distance on the leg.

(12) Afterburning/Power Level Angle Setting. Card columns 49-51 are reserved for this data, although presently unused. Enter the power lever angle setting in a percentage of afterburning, desired for this leg in the case of cruise climb or cruise profile. If a beginning altitude is input for the leg, the percent columns should be left blank as an optimum AB/PLA setting will be output by the program. An input percentage setting will generate an optimum altitude and ignore any input altitude. The only acceptable settings must match those input to the program, and used on cruise climb and cruise profiles. Should interpolation become necessary, the program will use the next higher setting with the output reflecting slightly higher altitude and fuel consumed figures.

(13) Refueling Data. This information is placed in CC's 52-57. Flight condition must reflect AR, HO or ID to utilize this operation. If fuel is onloaded, the total amount of fuel is "punched" in the CC's. For HO or ID, if no fuel was onloaded, leave blank.

(14) Turn Data. In Card Column 58 place the code A, B, R, or L for the type turn desired, if any, to be executed at the end of the leg. The A-type turn will cause the vehicle to roll-in on the input end coordinates and the program will determine the roll-out coordinates and establish the new true course to the next input coordinates. One or two nav system turn points will be determined as an output. The B-type turn will cause the roll-in to be determined on a set of coordinates short of the input coordinates, so the roll-out will occur on the great circle course to the next set of input coordinates. The end leg coordinates in this case become the nav system turn point coordinates if the turn is less than 120 degrees change. A B-type turn of more than 170 degrees change in course will be executed as an A-type turn. An R or L, signifying Right or Left, will be punched when it is desired to execute an A-type turn of more than 180 degrees change in course (i.e., turn back over the inbound track). If this option is used and the turn is not greater than 180 degrees, a normal A-type turn results.

If any type turn exceeds 120 degrees, the angle of turn will be halved and two nav system points will be generated.

In the case of turns from a point at the end of or during an AR flight condition, the program assumes all turns to be A-type turns in order to prevent conflict with alternate legs. The turn will be made to the next non-alternate leg. If there is no non-alternate leg following, the program will abort.

It should be remembered that an A-type turn requires a greater angle to complete a turn than is apparent on a point-to-point plot (i.e., a 180 degree turn will require the vehicle to turn through an angle greater than 180 degrees in order to make the next coordinates good).

If, on any turn insufficient distance has been allowed to start (B-turn) or complete (A or B) the turn, the program will ignore the turn and connect the two points with a straight line.

During cruise climb and cruise turns, fuel consumption is determined by using the bank angle to affect an adjusted gross weight (based on the G-force exerted on the aircraft) with no change in PLA/AB. Fuel consumption for other flight condition turns will be a proportionate share of the fuel to be consumed over the entire leg.

Altitude is maintained through the turn, for other than cruise or cruise climb, in which case altitude will be determined by using the adjusted heavier weight of the vehicle. Altitude may be maintained or increased by increasing the PLA/AB setting.

(15) Reference Point Data. This data is punched in CC's 59-79. Reference point coordinates, in degrees and minutes, for the leg determined by this card. The relative bearing and distance will be computed, by the program, to the point selected on each leg. Should there be no selected point, the computer program will reference departure point.

Card Columns data are:

59-60	-	Latitude Degrees
61-63	-	Latitude in Minutes and Tenths
64	-	N = North, S = South
65-67	-	Longitude Degrees
68-70	-	Longitude in Minutes and Tenths
71	-	E = East, W = West
72-79	-	Reference Point Identification

These data may be utilized for reporting, emergency alternates or fixing as desired.

b. Comment/Pertinent Mission Data Cards: This card(s) permits the planner to designate any/all pertinent data within the mission. A valuable capability, in that a man in the vehicle has a visual reference to the sequence of events, as they are to occur.

(1) In CC 1, place Route designator comment is associated with.

(2) In CC 2, place Leg designator comment is associated with.

(3) In CC 3, place a C to identify the card as one of leg comment.

(4) Card Column 4 is to remain blank.

(5) CC's 5-56 are used for free form comment. Repeat card format should there be several lines of events/comments.

(6) CC's 57-76 are not used.

(7) CC's 77-8Ø are used for a segment flag, with Column 8Ø being reserved for comment placement. If Column 8Ø is blank, the comment will be placed after the first route-leg designator generated. By placing an L in CC 8Ø, the comments will be placed after the last route-leg designator generated.

c. Weather Count Card: This card identifies, to the program, the number of weather data cards to follow.

Count Card Format:

CC 1 - 3 (Always)
CC 2-4 - Right justify total count of weather cards; e.g., 3Ø2Ø = 20 weather data cards will follow.

d. Weather Data Cards: This routine allows the planner to insert wind direction and velocity and temperature on each RLSG of the mission deck. It is unnecessary to match each RLSG of the

mission plan with a corresponding weather data card, although this capability exists.

Weather Data Format:

CC	1	-	3
CC	2	-	Route ID from Mission Plan
CC	3	-	Leg ID from Mission Plan
CC	4-5	-	Segment Number from Mission Plan
CC	6	-	+ or - sign of Temperature
CC	7-8	-	Numerical Value of Temperature
CC	9-11	-	Wind Direction
CC	12-14	-	Wind Velocity
CC	15	-	+ or - sign of "D" Value
CC	16-19	-	Numerical Value of "D" Value

e. Weather Tape: A weather tape routine sent to Headquarters by WECEN. An option of either the previously described method of mission weather or the WX tape is available for planner use.

The weather tape routine: CC 1 - Punch a 5. This is only card punch required and must follow mission cards but preceed 9 card.

f. Mission Termination Card: A card must be placed at the end of a mission deck which instructs the program to terminate.

CC 1 - 9 (This terminates the mission)

g. Mission Deck Format:

(1) Mission Classifier.

(2) Header Card.

(3) Free Form Comments.

(4) Leg Count Card.

(5) Leg Cards and Leg Comment Cards.

(6) Weather Count Card (if used).

(7) Weather Cards (if used).

(8) Weather Tape Card (if used).

(9) Mission Termination Card (9).

h. Plot 124Ø Control Card: The capability to plot the mission route, with a choice of various additional features, exists. A plot tape may be created in conjunction with generation of the mission plan.

Format and description of features requested:

In CC 1 punch Ø = Plot 36" jet navigation chart with route-leg identifiers

1 = Plot map 5150 (12")

2 = Plot any flight path scaled to 36"

In CC 2 punch Ø = Do not plot coastlines, boundaries, or grid

1 = Plot coastlines, boundaries, and grid

In CC 3 punch Ø = Do not plot tickmarks for overlay

1 = Plot tickmarks for overlay

In CC 4 punch Ø = Do not plot route-leg identifiers on flight path

1 = Plot route-leg identifiers on flight path

With ØØ11 punched in CC's 1-4, the output would be: a 36" jet navigation chart, without coastlines, boundaries or grids, with tickmarks for overlay and with route-leg identifiers on route path.